

activity, the latter implying a readily available respiratory substrate. Bark photosynthetic activity subsequent to precipitation may be of some importance in maintaining localized substrates utilized in leaf production. Knowledge of the precise adaptive significance of bark photosynthesis, if any, awaits more detailed studies.

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REVIEWS

The Quiet Crisis. By STEWART L. UDALL. xii + 209 pp, 32 plates. Holt, Rinehart, and Winston, New York. 1963. \$5.00.

This should be an influential book in contemporary United States conservation literature. A wide audience is assured by the author's position as Secretary of the Interior, the literary style, the brevity, the biographical approach, and the fresh insights into the history and future of the conservation movement in America.

The contrast between the American Indian's land ethic and that of the white settler is vividly portrayed. Gradually and sporadically a different set of values gained a toehold, with naturalists as the Bartrams and Audubon, the historian Parkman, and the philosophers, Emerson and Thoreau. George Perkins Marsh, and his international classic, *Man and Nature*, is given full credit as the intellectual "fountainhead of the conservation movement." It is a rewarding feature of this book that these men who had little immediate practical influence on conservation are accorded nearly as much space as those later "men of action" who usually dominate United States conservation treatises.

But "The Raid on Resources" had just begun, based on the "Myth of Superabundance," and expedited by the "Great Giveaway" of land as a federal policy. Men of action were needed, and their strengths and weaknesses are succinctly evaluated: Schurz and Powell, Pinchot and Muir, Mather and the two Roosevelts, Olmstead and Rockefeller. Curiously, Hugh Bennett and the Soil Conservation Service is accorded only eight lines, a neglect perhaps accounted for by the fact that the research staff of the Department of Interior, who are acknowledged by the author as collaborators, timidly avoided crossing departmental lines to cover Department of Agriculture affairs.

Unusual emphasis for volumes of this sort is afforded the role of the private foundation, city planning, and the importance of wilderness. The approach in general is aesthetic and biographical rather than ecological and technical. The author's acknowledgements to the works of Leopold, DeVoto, Krutch, Stegner, Atkinson, and Mumford, and his relatively full treatment of the naturalists and philosophers, clearly show a recognition of non-material as well as material benefits of conservation philosophy. This emphasis serves to counterbalance that powerful segment of the present schizoid conservation movement which desires nothing more than a continuous sheet of highly productive crops, hybrid trees, or cows over a fully domesticated and manicured earth's surface. The controversy, described by Udall, which developed between Pinchot and Muir on this issue continues unabated today, as shown by current debate on the Wilderness Bill in Congress. Possibly this point could have been given more than an aesthetic foundation alone by incorporating more ecology—

for example, the value of relatively undomesticated ecosystems interspersed in space and time with the inevitable but productive monocultures, in order to provide greater homeostatic buffering in the form of high diversity against pest outbreaks and soil deterioration. The avoiding of oversimplification of food webs and inadequate circulation within vital biogeochemical cycles is a corollary of diversity which also can help weld aesthetic and practical considerations together. The space afforded the population problem is not in proportion to its significance.

These criticisms do not detract from Udall's accomplishment, which can perhaps best be summarized by his own words in the forward: "Each generation has its own rendezvous with the land, for despite our fee titles and claims of ownership, we are all brief tenants on this planet. By choice, or by default, we will carve out a land legacy for our heirs. We can misuse the land and diminish the usefulness of resources, or we can create a world in which physical affluence and affluence of the spirit go hand in hand." — JOHN PELTON, Butler University, Indianapolis, Indiana.

Vegetation and Flora of the Sonoran Desert. By FOREST SHREVE and IRA L. WIGGINS. Vol. I, x + 1-840 pp., 37 plates, 27 maps; Vol. II, v + 841-1740 pp. Stanford University Press, Stanford, California. 1964. \$22.50.

The Sonoran Desert, one of the most arid areas of the North American continent, has received a botanical treatment in these two volumes that rivals the best account for any similar land surface. Nearly all of Part I of Volume I we have seen before as Carnegie Institution of Washington Publication No. 591 but the bulk of the work as a whole is entirely new. The decision to reprint the contribution of the late Forest Shreve in the present work is a fortunate one, for it puts into the reader's hands an out-of-print publication that deserves to be a part of the package, as it was originally intended by the authors. The fold-out maps of the Shreve contribution have been reduced to page size in the reprinted portion without loss of clarity. These maps, Map 1 and Map 2, appear on pages 6 and 7 and they are very effectively used on the back and front covers and adjoining pages of both volumes. Looking at Map 2, showing the routes taken during the many field trips of the authors throughout the Sonoran Desert, permits one to visualize the vitality of the work they have produced. But one has to remember that the map dates back to the late 1940's and that the many trips made by Wiggins since then are not shown.

The work is vital because it represents and reflects the first hand, on the spot knowledge gained by numerous contacts with the living plants in their natural settings. This is not to imply that the deliberative, scholarly activities of the laboratory, herbarium and library have been neglected. By no means is this the case. The work on many of the richly represented genera of the flora are minor or major monographs in themselves. It is difficult, if not impossible, for the non-taxonomist to appreciate how much sustained effort goes into a publication of this nature. I am thinking particularly about the flora portion written by Wiggins. Here in the final product, we see what has become in floristic works generally, a shortened telegraphic style that follows a rigidly formal pattern. The information is packed into limited space with a uniformity that obscures the torment and labor required to produce it. Yet to do it differently, in a legitimately expanded and more informal way, would have required three fat volumes instead of two.

The treatment of genera and species is moderately conservative and will have a lasting influence on subsequent works dealing with the general region because of the reliability achieved. As an example, one finds in the handling of the Cactaceae, where it would be easy to include many more genera by following recent reckless literature, a balanced position is taken with 23 genera recognized. In this family, *Opuntia* is one of the genera with a large number of species represented in the flora, having a total of 47 in all. *Mammillaria*, with its 39 species, further emphasizes the diversity at the specific level within the Cactaceae.

The Sonoran Desert flora is a distinctive one, with many taxa of restricted distribution, many with unusual diversity, and others made up of plants with strange